THE STATE PARKS OF HOCKING COUNTY, OHIO.

KARL VER STEEG,
College of Wooster.

Not far from Athens and to the southwest of Logan, the county seat of Hocking County, is an area of country unequalled in Ohio for its scenic beauty. This region has a wealth of natural beauty, for the most part still in its original condition. The attractiveness of this rugged area is enhanced by the virgin stands of hemlocks, poplars and oaks and the profusion of ferns, shrubs and flowers. Through the steep-sided, shady gorges wind trails through virgin forest made up of giant trees, the like of which are seen in few places in Ohio. This region is especially interesting to geologists and botanists as well as to those who love nature and the out-of-doors.

The recreational possibilities of the state parks are being appreciated to a greater degree each year, as indicated by the increasing attendance. The total number of visitors, coming from 38 states and Canada, in five recreational areas in Ohio, during the first ten months of 1931, was 256,557. Of this number 186,557 visited the parks in Hocking County, apportioned as follows: 51,648 at Ash Cave Forest Park, 53,049 at Rock House Forest Park, 75,765 at Old Man's Cave Forest Park and 6,095 at Cedar Falls Forest Park. The attendance figures compare favorably with those of the larger better known national parks of the country.

The state park domain includes Ash Cave Park of 262 acres, Old Man's Cave Park of 1,010 acres, Cedar Fall's Park of 30 acres, Conkle's Hollow Park of 723 acres, Rock House Park of 517 acres and Little Rocky Park of 290 acres, a total of 2,832 acres in the Hocking County series of State Forest Parks.

Under the able leadership of State Forester Edmund Secrest, who has so faithfully served Ohio for the past 26 years, a program was inaugurated and maintained, whereby tracts of forest land were set aside in accordance with a definite policy of conservation. Through Mr. Secrest's efforts, the State Forest Law was passed (1915) and more recently an amendment to it, which enables the state to acquire by purchase or gift

such areas which it is necessary to receive for the public good and may include sites of scenic value, virgin woodlands, and areas desirable for recreation and reforestation. Through the operation of this law, Ohio has acquired a total acreage of more than 50,000 acres; 45,429 acres of State Forest and 4,769 acres of State Forest Parks. Perpetuation of our timber supplies, protection from soil erosion, preservation of natural beauty are the fundamental principles of the forestry program in Ohio.

The aim of the park authorities is to maintain the natural features of the region in all their pristine beauty. Here we have an area which is for the most part a wilderness. One can find roads cut through country that has remained almost unchanged during the last fifty years. Another excellent feature about these parks is their accessibility. They are easily reached by improved roads. Fire hazards have been removed, water supplies provided, camp sites and parking places cleared, paths cut through the forests, and steps cut in the solid rock at points where travel is difficult, all of which add to the wilderness spot that touch of civilization so desirable to tourists, but which park authorities are anxious to avoid as much as possible. Artificial conditions which are necessary, are restricted to limited areas on the outside, so that the natural beauty for which the place was secured, might remain unchanged as far as possible.

The saddest of sights are the abundant evidences of vandalism in the parks throughout the country. I refer to the writing of initials and names and other inscriptions on the rocks, the destruction of signs, the plucking of wild flowers and tearing up of shrubs and young trees and the indiscriminate disposal of refuse. Either we are not a law-abiding country or our education has failed to give us a sense of responsibility for the protection of the beauties of nature. Students in our schools should be taught not only love for nature but its protection as well. Community organizations can render a good service in promoting a sentiment for the suppression of the various forms of vandalism in Ohio woods.

PHYSIOGRAPHY AND GEOLOGY OF THE AREA.

The region is a portion of a maturely dissected upland, commonly known as the Appalachian Plateau. The highlands consist of long, narrow ridges which are deeply indented by hollows and gullies, where small streams have worked their

way up the slopes, forming many minor projections on the ridges which present a very rugged or serrated appearance. The highland plains have been so completely dissected by major streams and their tributaries, that the remnants appear as a network of long ridges with narrow summits and steep slopes. Farming is largely confined to the summits of the ridges and along the valley plains. The hillsides are forested or are used for pasturage. The higher ridge-crests stand at an elevation ranging from about 1,040 to 1,160 feet above sea level. The majority of the hills are below 1,100 feet and the valleys have an altitude ranging from about 680 to 780 feet above tide, the relief being approximately 200 to 375 feet. Generally speaking the bottoms of the deep, narrow gorges are perhaps 200 feet from the top of the cliffs which form their walls. The area is drained by Pine Creek and Queer Creek and their tributaries. These streams unite to form Salt Creek, which flows southward into the Scioto River. They occupy broad, mature valleys and some of the tributaries have narrow flood-plains in their lower courses.

A few miles to the southwest of Logan, breaking off sharply from the rounded hills and broad, fertile valleys on the uplands which surround the city, the country becomes rugged, with well-defined, deep, rocky gorges and narrow valleys. There are two districts in which the gorges appear, a south one along the three branches of Queer Creek and a north one on Pine Creek. In the Queer Creek district there are eight or nine miles of gorges, including Ash Cave on the lower or East Fork, Cedar Falls on the central branch and Old Man's Cave on the upper end of the north gorge, known as "The Gulf." The Pine Creek district contains four gorges and narrow valleys and six or seven smaller ones about a mile long, all running south into Pine Creek Valley. All the streams which flow into Pine Creek from the north occupy deep, narrow chasms varying from 50 to 175 feet in depth. They are heavily wooded with hemlocks and hardwoods. These gorge-like valleys are less frequented than the others and to those who enjoy tramping, away from the well-trodden paths, this region is especially delightful. Naming them from the east these parallel valleys are as follows: Big Rocky, Little Rocky, Springer Hollow, Crane Hollow, Conkle's Hollow, and Spruce Run, all of which, with the exception of Big Rocky and Crane Hollow, are state parks. North of the Pine Creek valley is Rock House Park. It is

located at the upper end of a small tributary to Laurel Run, which flows into Salt Creek.

If one stands on the high points on the ridge-crests or on the fire-lookout near the Rock House, he is impressed with the remarkably even sky-line. In Hocking County and adjacent areas, the main ridges along the water divides rise to a rather uniform height, the average of which is not far from 1,060 feet above tide. The variation is commonly between 1,020 and 1,100 feet. This level marks a peneplaned surface which has been uplifted and dissected by subsequent erosion to a fragmental condition. It rises gradually eastward and can be traced into, and is correlated with the Harrisburg peneplane of western Pennsylvania. As the result of the development of this surface, an earlier peneplane, commonly known as the Cretaceous but now believed to be younger, was almost completely removed. This surface, well-developed on the ridge-crests of eastern Pennsylvania, has been referred to as the Schooley (Kittatinny) peneplane. The Harrisburg surface was uplifted and dissected, the streams cutting deep valleys with wide gradation plains along their courses, reducing the divides between the drainage basins to lower levels. This peneplane, if it may be so called, is known as the Worthington in Pennsylvania, where it appears as a broad strath along the major streams. It is far less complete than the Harrisburg surface and extensive remnants of the latter appear over wide areas. In Hocking County, in the park area, the Worthington surface stands at an elevation averaging about 920 to 940 feet on the spurs along the larger streams, but in general is nearer 1,000 feet for the entire area; the average altitude of this surface for Ohio is not far from 1,000 to 1,100 feet. It slopes gently upward into the Harrisburg level and is somewhat higher near the main divides and lower toward the central portions of the drainage basins. During Worthington time the streams dissected the Harrisburg surface and cut broad valleys well toward their headwaters. The Harrisburg and Worthington peneplanes occupy about one-third of the total area.

In late Tertiary time, just before the ice age, a still lower erosion surface, the Parker Strath, was developed by erosive agencies. The term "Parker Strath" is applied collectively by Wilber Stout, of the Ohio Geological Survey, to the remnants of old valleys which stand well below the Worthington level.

This new cycle of erosion was inaugurated by a slow uplift of the land as a result of which the streams were rejuvenated and began carving valleys in the elevated surface. The streams maturely dissected the older surfaces and cut rather broad valleys with moderate slopes, 200 to 290 feet below the mean level of the Worthington peneplane. The further development of the Parker cycle was arrested by the advance of the glaciers of Pleistocene time, which caused a general modification of the drainage systems of the region. Since the ice age, the streams have been engaged in eroding to still lower levels. Remnants of the Parker Strath appear along Pine Creek and Queer Creek at an elevation of about 700 feet. The valley slopes rise rather abruptly from the Parker level to the Worthington surface, then much more gradually to the Harrisburg peneplane, remnants of which occur on the higher ridges.

There is abundant evidence that the youthful streams which occupy the gorges are at present actively cutting headward, dissecting the upland valleys, which are broad and shallow. The latter border the gorges and break off abruptly at the heads of the valleys which terminate in a precipice that usually overhangs. On the upland is displayed the ancient topography of the Harrisburg and Worthington cycles, and below, the more rugged topography produced by subsequent erosion. It is true that the weaker rocks above the Black Hand conglomerate have allowed greater erosion and hence broader valleys would result, and the sharp change from the upland to the gorges below could be in part the result of a difference in the resistance of the rocks to the erosive agencies. The same principle is the explanation of the rock terraces in valleys such as the Grand Canyon of the Colorado River.

The formations exposed in Hocking County were laid down during the Mississippian and Pennsylvanian periods. The principal formations belong to the Waverly group, the lower division of the Mississippian. The sandstones, conglomerates and shales of the Waverly have a total thickness of nearly 1,000 feet and can be grouped in several distinct members. The subdivisions of the Waverly in Hocking County, according to J. E. Hyde* are as follows, the Bedford shale, Berea grit, Sunbury shale, Cuyahoga and Logan formations. The only formations which concern us here are the Cuyahoga and Logan. Each of these have their subdivisions. The Cuyahoga, about

*Stout, Wilber, Geological Survey of Ohio, Bull. 31, p. 43, 1927.

600 feet thick, is composed of three members, the Lithopolis, Fairfield and Black Hand. The Lithopolis is made up of shales with fine-grained sandstones, the Fairfield of coarse sandstones and conglomerate, and the Black Hand of massive, cross-bedded sandstone and conglomerate. The Logan formation is subdivided into four members, the Berne, an evenly bedded conglomerate; the Byer, a fine-grained sandstone; the Allensville, a coarse sandstone, and the Vinton, a fine-grained sandstone and shale. On the ridges, above the Waverly group, lie the lower divisions of the Pennsylvanian Coal Measures, consisting of shales, clays, sandstones, conglomerates, coal and thin beds of fossiliferous limestone. The formation which concerns us most in a description of the features of the parks, is the Black Hand member of the Cuyahoga formation. This member is thick in Hocking County, being from 100 to 200 feet. It is for the most part a massive, conglomeratic sandstone, forming numerous prominent ledges in the streams which cut deeply into it. Where the streams have cut into it to any great depth, steep-sided gorges are produced. The walls or cliffs of these narrow valleys are usually in a vertical or overhanging position. The scenery of the park area is almost wholly the result of the weathering and erosion of the hard, resistant Black Hand member. A more detailed description of this member would include the fact that in Hocking County it is non-fossiliferous and is made up of sandstone and conglomerate. It is commonly sandstone with small pebbles of white quartz varying in size from a pea to one-fourth or one-half of an inch in diameter, scattered through the body of the sandstone in thin streaks. It is beautifully cross-bedded in places. The color varies, being dark brown or red on the outside where it is weathered. Where covered with lichens or moss it presents a green appearance. Beneath the weathered portion the sandstone is yellow or buff and in some places red or orange-red. Differential weathering has added to the picturesqueness of the cliffs. The beds of sandstone and conglomerate of the Black Hand member vary greatly in their resistance to weathering and erosive agencies. The weaker beds frequently form hollows or caves, whereas the more resistant layers stand out as projecting ledges or form benches. The Black Hand member is broken into huge blocks by joints; the wide spacing of the joints and the thickness of the beds is responsible for its massive character.

At present the dip of the beds is about 30 to 35 feet per mile to the southeast. At the time the Cuyahoga formation was laid down, Ohio was a shallow sea. A study of the Black Hand conglomerate and sandstone appears to indicate that strong currents were sweeping gravel from the southeast. The coarseness of the material, the abundance of cross-bedding and its direction of slope to the north, indicate delta growth or bar development under strong oceanic currents. When traced into Pike County to the westward and southward into Scioto County, the Cuyahoga conglomerates change rapidly to shale. Where the Black Hand member is thick and composed of sandstone and conglomerate the picturesque gorges are present, but where it is shale these features are absent.

FLORA.

A description of the park area would not be complete without a brief discussion of the flora of the region. According to State Forester Edmund Secrest, the Hocking County Park area has the finest stand of virgin forest in Ohio. It is least disturbed of any forest in the state; in some of the gorges few if any trees have been removed. In Cedar Falls valley stands what is said to be the tallest tree in Ohio, a hemlock 149 feet high and 40 inches in diameter. The value of the timber, in the Rock House Forest Park, at the time of purchase was worth more than the purchase price of the area. The forests of the region are interesting because they represent different types, the one in the gorges and narrow valleys the cool, northern forest as is found in New England and northern states and another on the uplands which is a southern type. The northern forest is represented by the hemlock, beech, sugar maple, and yellow birch and the southern by the chestnut, tulip-tree, pitch pine, jersey pine and sorrel-tree.

The Hocking County area has long been known by Botanists as one of the richest collecting grounds in Ohio. According to the report by Griggs,* in its general relationships the flora may be described as an outlier of the great Allegheny Mountain flora, from which it derives a considerable number of plants, like the Great Rhododendron, which do not occur elsewhere in Ohio. There are also a number of plants, like the Lycopodiums, which belong in the Canadian area and come down into Ohio

*Griggs, Robert F., A Botanical Survey of the Sugar Grove Region. Ohio Biological Survey, Vol. I, Bull. I–IV, 1913–1915, pp. 248–340.

from the north, reaching their southern limits in this region. There is a third element of southern plants, such as Aralia Spinosa, which stretch up from Kentucky and Tennessee and reach their northernmost limits in this area. The region is therefore interesting because of the possibilities of collecting, the study of the geographic range of plants and the ecology.

The deepest forest in the region is that formed by the hemlock, which is most luxuriant on the sides and bottoms of the deeper ravines. In the deeper gorges, conditions more nearly resemble those of the tropical rain-forest than anywhere else in the area. The humidity is high and the shade is so intense in some places as to prohibit the growth of plants other than the forest trees themselves. The Liriodendron forest occurs under conditions little different from the hemlock forest it is replacing. Its most typical development is present in the short, steep ravines, surrounded by high hills, within which the timber is unusually tall, straight and free from knots and wind checks. The tulip-tree is most characteristic of this type of forest. Chestnut, hemlock, butternut, American beech, red maple, tupelo, shagbark hickory, white oak, quercitron oak, sweet birch and red mulberry occur in order of abundance. In general a variety of smaller trees and shrubs grow beneath the forest canopy. Among these are the witch-hazel, flowering dogwood, wild hydrangea and others. The herbage is composed of a large number of species. In the most shaded woods, herbs with evergreen or hibernating leaves are abundant and conspicuous. Where not too shaded there is a rich development of vernal herbs with showy flowers. Later in the summer the places of these are taken by another group. The phanogams without chlorophyll are represented by the parasitic squaw-root and beech-drops and saprophytic Indian-pipe and smooth pine-sap.

The upland forest is divided into the pine and oak forests. The former occupies the poorest soil capable of supporting arborescent plants and bears a general resemblance to the pine barrens below the glacial moraines. The most important trees are the pitch-pine, scrub-pine, quercitron oak, chestnut and sorrel-tree. The pine forest occurs on the more exposed ridges where conditions are severe. Where the conditions are less severe the pines give way to the hardwoods and a mixed oak forest. The rock chestnut oak is sometimes the dominant tree. With it are present the white oak, quercitron oak, sorrel-tree,

chestnut, shagbark hickory, tupelo, and red maple. The upland oak forest coincides with the limits of arable soil and originally covered a large part of the region. As a result of lumbering most of the oak today is the worthless black oak.

PROCESSES INVOLVED IN THE FORMATION OF THE GORGES AND THEIR FEATURES.

The canyon-like valleys are youthful and exhibit all the characteristics of youth, such as waterfalls, clear, swiftly-flowing streams actively cutting downward, steep walls with bold rock outcrops and a V-shape or box-canyon cross-section. The rate of down-cutting has been rapid and weathering and erosion have not been sufficient to reduce the resistant Black Hand conglomerate to slopes, resulting in narrow, steep-sided valleys. Most of the streams in the region terminate in "coves" or steep-walled, amphitheatre-like slopes. The head of the valley usually ends abruptly in a semi-circular, overhanging cliff, or a series of ledges forming waterfalls or rapids. Above the cliff, the streams flow in broader, shallower valleys, which represent an older erosion surface. There is much evidence that the streams are at present actively extending their gorges headward. Usually the "coves" are present at the heads of the gorges, but in at least one case, at lower Old Man's Cave, there is one which does not occur in that location. The streams in cutting downward have in many instances produced a series of rock benches, forming one might say, giant steps up the valleys.

In the "coves" at the heads of the gorges, as at Cedar Falls, Ash Cave and Conkle's Hollow, not to mention others, there are usually fine examples of pothole action. The undermining of the base of the cliff by pothole action is doubtless the cause, in large part, of the gradual retreat of the falls and the lengthening of the gorges. The sandstone caves, so common in the region are the result of weathering and pothole action in the "coves," and undercutting by the streams where they impinge against the walls of the narrow gorge. The streams are, with few exceptions, temporary ones. During a dry summer, water flows through the valleys only during periods of heavy rainfall. At such times the streams have great volume and consequently great erosive power.

There is evidence to indicate that the jointing of the conglomerate is to some degree responsible for the canyon-like

valleys. The Black Hand member is broken into huge blocks by at least two joint systems, running at about right angles to each other. The tendency is for the smaller streams to follow the larger joints which offer less resistance to erosion. At Ash Cave, Cedar Falls, Conkle's Hollow and other places, especially where there are small tributaries, one can observe the tendency to follow the lines of least resistance along the joints. The block-jointing tends to produce angularities of the gorge walls and is also responsible, to some degree, for their vertical position.

Differential weathering is also the cause of some of the picturesque features of the gorges. Water, carbon dioxide, and oxygen find their way into the joints and bedding planes in the conglomerate and enlarge them, making it easier for running water to erode. Where the rock is resistant to solution or chemical decay, the beds project and where rapid weathering takes place, caves with overhanging ledges are produced. Rock decay along the joints has allowed trees and shrubs to take hold and by extending and enlarging their roots, the rock is further disrupted. In the environment of the shady glens the moisture content of the air is near the saturation point and weathering is more rapid than on the uplands. The mosses, lichens and shrubs which grow in abundance on the walls and talus slopes at the base of the cliffs, hold the moisture and aid in the process of rock decay. When first quarried the Black Hand sandstone is friable but on exposure to weathering becomes hard and durable. Usually the upper thickness of perhaps 5 or 10 feet of the Black Hand member projects prominently, forming overhanging ledges such as the roofs of Old Man's Cave and Ash Cave. It happens that the exposed top of the cliff becomes much harder by exposure to weathering, whereas the protected portion weathers away more rapidly, forming an overhang. Processes similar to those which are operating to form the gorges in Hocking County are also responsible for other scenic chasms, such as The Dells of the Wisconsin, Watkins Glen, Niagara George, Ausable Chasm and others.

OLD MAN'S CAVE PARK.

This is the most popular of the Hocking County group of parks and was selected by the Ohio Federation of Women's Clubs as the outstanding beauty spot in Ohio. The principal features are two caves, upper and lower Old Man's Caves,

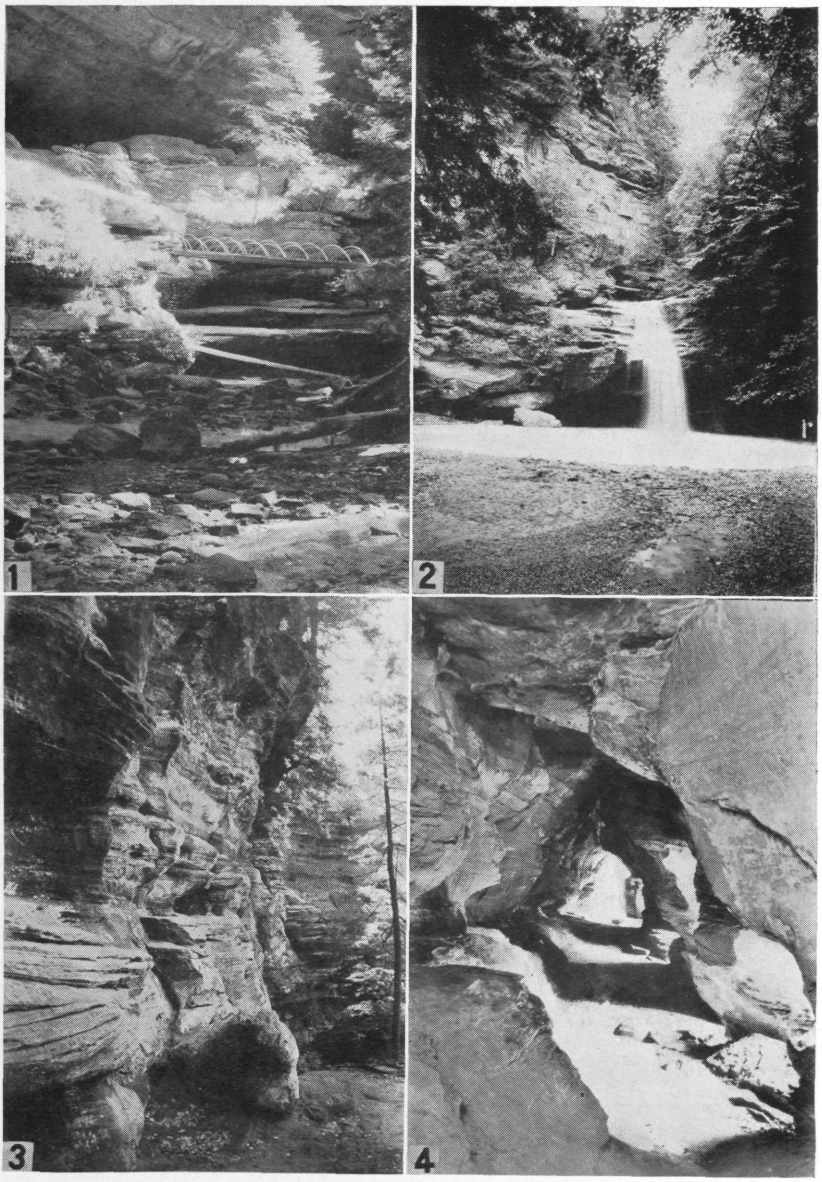

FIG. 1. Upper Old Man's Cave.
FIG. 2. Lower Old Man's Cave and Falls.
FIG. 3. Rock House Cliff.
FIG. 4. Interior of the Rock House.

picturesque waterfalls and two miles of heavily wooded gorge. The upper cave is located in a vertical cliff about 75 feet above the creek. Here a combination of weathering and erosion has produced an overhanging cliff. It is probable that the stream, when at the level of the cave, impinged upon the cliff and undermined it. Further deepening of the valley by the stream has lowered it below the level of the cave. The overhanging cliff at upper Old Man's Cave projects about 100 feet above the creek. The cave is not far from 200 feet long and 50 feet deep and has the form of a half-dome, a shape characteristic of all the caverns in the region. This is the form one would expect where streams have undermined a cliff and produced an overhang.

The gorge above and below the upper cave offers as fine an example of a glen as can be found anywhere. Giant hemlocks and hardwoods raise their leafy boughs above the gorge to the sunlight. The towering walls of the miniature canyon rise a hundred or more feet above the creek. Beneath the forest canopy are a profusion of ferns, shrubs and flowers, all of which add materially to the beauty of the valley. The width of the gorge above upper Old Man's Cave varies, widening and narrowing, from 30 to 50 feet. The upper gorge ends in a picturesque "cove," a semi-circular, overhanging cliff. The stream on the upland flows in a broad, shallow valley and falls over the sandstone ledge into the gorge below. A large, circular pool of water marks the pothole at the base of the falls. A cave, produced by the swirling water in the pothole at times of heavy rain, is present. The upper gorge ascends in places by rock benches, the stream descending by a series of falls or rapids.

Below upper Old Man's Cave, at a distance of perhaps a hundred yards, are the lower falls and lower Old Man's Cave. Here the water falls a distance of 30 to 40 feet to a pothole below. The cave is not far from 200 feet long, 50 feet wide and 40 to 50 feet high. There is evidence that in time of heavy rain, the water at the base of the falls accomplishes the undermining which produced the cave. The pool in the pothole is approximately 50 feet in diameter. The combination of waterfall, towering precipitous cliffs, mirror-like pool and cavern with the added beauty of the forest, make it easily the most scenic spot in the region. Below the lower falls the gorge is considerably wider and deeper than above. The stream has a small floodplain near its mouth and the benches over which

the creek flows are not so conspicuous. Great heaps of talus, composed of enormous blocks of sandstone and conglomerate, have accumulated at the base of the towering cliffs. On the whole the lower gorge is perhaps less scenic than the upper one. A very pleasant walk is possible by following the trail down the lower gorge and up Cedar Falls valley to Cedar Falls and across the upland back to Old Man's Cave.

CEDAR FALLS PARK.

Cedar Falls is located at the head of a gorge the stream of which flows into Queer Creek. There is the characteristic semi-circular cliff over which the water falls a distance of 50 or more feet, a pool at the base of the falls and a cave produced by pothole action. The gorge below Cedar Falls is similar to the one at Old Man's Cave, in fact it is really an extension of Old Man's Cave Park. It is possible to walk by trail from Old Man's Cave through an attractive, heavily wooded valley to Cedar Falls.

ASH CAVE.

Ash Cave is perhaps not the most beautiful spot in the region, but it is by all means the most spectacular. The ravine or gorge is short and ends in a gigantic cavern. A stream flowing in a broad, shallow valley on the upland, dashes over a semi-circular, projecting cliff or overhanging ledge of sandstone which forms the roof of the cave, to the bottom of the gorge a hundred feet below. The cave is approximately 700 feet long, 100 feet wide and 90 feet high. The origin of the cavern is not unlike the others in the area. The projecting ledge of sandstone which forms the roof of the cave is more resistant to weathering than the more protected beds of sandstone and conglomerate beneath. At times, during periods of heavy rainfall, pothole action is an important factor in undermining the cliff. The water sweeps away the accumulated debris at such times when the floor of the gorge is covered with water. When there is sufficient water in the stream, the falls are beautiful and in winter the ice formations are well worth seeing. The gorge is heavily wooded and very attractive.

ROCK HOUSE.

Many would call this celebrated natural feature the most interesting and unique in Ohio, a natural jewel in a splendid setting. It is not only unique but spectacular as well and

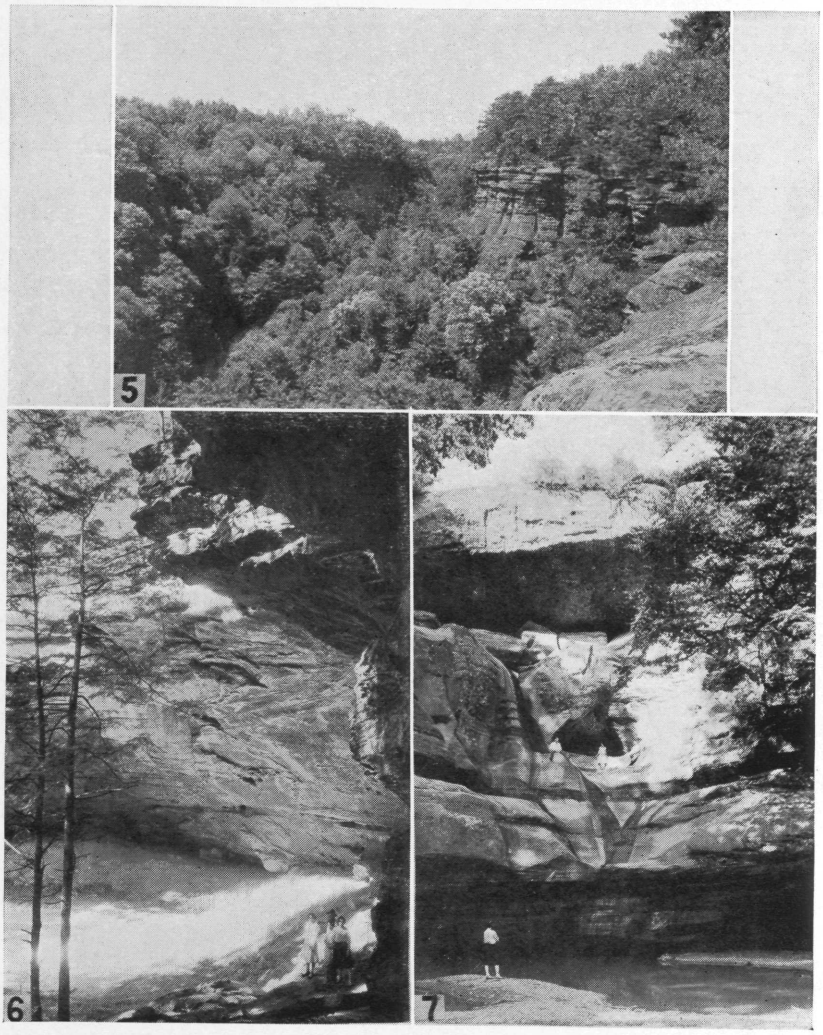

FIGURE 5. Conkle's Hollow.

FIG. 6. Ash Cave.

FIG. 7. Cedar Falls.

travelers say there is nothing just like it in this country. It is one of the best known of all natural attractions in Ohio and has been a popular beauty spot in Hocking County for more than a half-century. It is a house hewn out by nature from a wall of solid sandstone and conglomerate, 150 feet high. The Black Hand sandstone is here displayed at its best, a towering, overhanging cliff rising vertically from the gorge below. It shows the bright color where freshly exposed, red and brown where weathered and green where covered with moss and lichens.

The cave is about 200 to 225 feet long and varies from 25 to 30 feet in width at the level of the floor and is approximately 25 to 30 feet high. In most caverns the entrance is a narrow aperture, but here the sandstone has been weathered along the joints, forming a long corridor, opening out at the ends in two gothic doorways, at a point about half the height of the precipice. Along its front, enlargement of the joints by weathering has produced large sandstone pillars, the portals between them serving as windows. Nature has carved a gothic hall with windows and columns to bear the weight of the massive roof. There are five pillars and seven openings, the former being widest at the top, varying from 15 to 40 feet in diameter and from 15 to 20 feet in height. They are very irregular in shape, the result of differential weathering. The irregular outline of the windows stands out sharply against the more luminous background of the forest, as viewed from the darkness of the cavern. Each window is located along a large joint where weathering has been most effective. The joints are everywhere visible and can be easily traced from the windows along the roof and into the wall which forms the rear of the cave. The same process of weathering which formed the windows is at present taking place on the rear wall of the cave. Enlargement of the joints has produced vertical clefts in the wall, the blocks between standing out in bold relief. One set of vertical joints extends at right angles to the face of the cliff and breaks the sandstone into blocks 15 to 40 feet in width. Another set extends at right angles to the above mentioned set and runs parallel to the face of the cliff. Enlargement by weathering along one of these joints is responsible for the elongate corridor. This joint is very conspicuous along the roof and can be seen along the floor in some places. A cross-section of the cave at right angles to the cliff, gives an outline

like that of the gothic arch, wider at the floor, the walls converging upward and disappearing along the joint which runs the entire length of the cave. The end windows are located along this master joint. The cave is the product of differential weathering along two sets of master joints running at nearly right angles to each other. Where the cave is widest the sandstone crumbles readily and is more easily weathered than elsewhere. This is borne out by the hollows formed on the weaker sandstone on the back wall of the cave. In the grotto the well-bedded sandstone forms benches, one of which is about eight feet high and runs the entire length of the cave.

Rock House Park has other attractive features. It is possible to walk along trails which lead through the wooded country. A view from the fire-tower located not far from the Rock House gives one an excellent view of the surrounding region.

CONKLE'S HOLLOW.

Conkle's Hollow is not as well known and not as easily reached by good roads, but in some respects surpasses the other parks. It is different and has an individuality all its own. It is a deep rocky gorge, unimproved and nearer its original condition than some of the other areas. It is a wilderness, with great hemlocks and hardwoods and a profusion of ferns and shrubs in the moist, shady environment beneath. The canyon, if it may be so called, is wild and picturesque, with towering cliffs which rise more than a hundred feet above the floor. In some places the cliffs overhang and so narrow is the gorge that the writer estimated the distance at the top, from cliff to cliff, to be not more than 300 feet. Conkle's Hollow is most spectacular in winter when the cliffs are everywhere visible. The gorge is of unusual interest if one is prepared for strenuous climbing, to cover three distinct levels in the rocky hollow. The gorge ends abruptly in a "cove" similar to the others in the region already described. The valley narrows to a defile with almost unscalable cliffs at its head and ends abruptly in an overhanging ledge of sandstone. The cave is semi-circular in shape and not far from 50 feet long, 30 feet wide and 25 feet high. The water dashes into the cave from the upland through a cleft in the roof. A pothole, marked by a pool of clear water, occupies a large portion of the floor.